

CHRONIC  
INTESTINAL  
STASIS.

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Using the term in its strictest sense we understand that there is an unusual period of time during which the contents of the alimentary canal are retained within that tract. In many individuals where this delay takes place there are no manifestations which bring the case before the physician. We therefore have come to regard the term as applying to the clinical picture which is considered to result from the state of chronic intestinal stasis.

This condition is of frequent occurrence and its effects are often far reaching and distressing. It occurs in every period of life, in every race and climate, and in both sexes. It is found in both rich and poor.

Its effects may be local or manifested in parts far removed from the gastic-intestinal tract. In many cases the condition may exist without demonstrable cause, or there may be some pathological change, e.g. visceroptosis.

Since the work of Arbuthnot Lane it has been the subject of a large amount of medical literature. Many of the cases of ordinary obstinate constipation occurring in general practice, may in the light of Lane's work, be looked upon as cases of chronic intestinal stasis.

The primary factor is a delay in the contents of the intestine. The products of

bacterial or chemical changes exist in an abnormal quantity and are carried to every tissue in the body. Degeneration takes place representing the clinical state which the writer proposes to discuss in the present thesis.

The Alimentary Canal is developed from three separate parts - a large middle portion and two smaller portions, one anterior and one posterior. These portions are at first separated by septa; these disappear early and there is thus formed a tube extending from the mouth to the anus.

The tube becomes modified in different parts so as to form special organs, and in many regions outgrowths occur from which the accessory glands are formed; these glands eventually lie outside the wall of the tube - the liver, pancreas and salivary glands arise in this way. Other structures also arise as diverticula of the alimentary canal, but eventually lose their connection with the canal and become specialized in function, viz, the thyroid gland, parathyroids and thymus gland.

Very early the gut shows an enlargement in the region of the developing heart; this enlargement which takes the form of an outgrowth is the first evidence of the stomach. On the formation of the diaphragm the stomach descends into the abdomen. The future great curvature grows

rapidly, the whole organ becomes curved and turns over on its right side. At first there is no separation into small and large intestine - the primitive canal forms a simple tube. Later the tube increases in length and an outgrowth appears which represents the future caecum, and indicates the separation into small and large intestine. Growing longer the small intestine is thrown into coils.

The outgrowth which represents the caecum increases in length - the basal portion is quite as wide as the intestine, whilst the remainder - the future vermiform appendix - is only one third the diameter of the gut. The terminal portion of the small intestine adheres to the medial side of the caecum by two folds of peritoneum below the ileo caecal orifice.

The digestive system consists of the alimentary canal, special organs found in the wall of the canal and accessory glands placed external to the canal. The canal measures about thirty feet in length. The mouth containing the teeth (32), gums and tongue leads into the pharynx with the palatine tonsils on either side. The pharynx is continued into the oesophagus - a long and comparatively straight tube passing through the neck and thorax to the abdomen piercing the diaphragm. The tube immediately expands into a

dilated chamber - the stomach. The stomach constitutes a receptacle in which the food accumulates, and in it take place some of the earlier processes of digestion resulting in the conversion of the food into chyme.

The form and position of the stomach vary greatly, not only in different individuals but in the same individual at different times. The degree to which it is filled, the size and position of the adjacent organs and the assumption of the erect or recumbent attitude can influence its shape and position.

The stomach consists of four coats, - the serous, the muscular made up of three layers arranged in different directions, the submucous and the mucous membrane with its many irregular folds and its cardiac and pyloric glands. The pylorus is marked by an annular constriction.

The small intestine extends from the pylorus to the ileo-caecal valve, it is about twenty feet in length and is arranged in numerous convolutions. In form it is cylindrical with a diameter of about two inches at the duodenum to a little over one inch at the ileum. The duodenum is about eleven inches long, is horse shoe shaped and having no mesentery it is fixed to the posterior abdominal wall. The common orifice of the bile and pancreatic ducts opens into the duodenum about four

inches from the pylorus. The jejunum or upper two fifths of the remainder and the ileum or lower three fifths are disposed in irregular coils and are connected to the posterior abdominal wall by a great fan shaped fold of peritonium - the mesentery. The coils can move about freely in the abdomen - the only fixed points being at the duodenum and ilial termination.

The mucous membrane of the small and large intestine is closely set with numerous tubular glands (Lieberkuhn's Glands). The villi give the mucous membrane of the small intestine its velvety appearance, they are minute finger like projections. The plica circularis occur as permanent transverse folds resembling a series of closely packed shelves.

The solitary lymph nodules project on the surface in both the small and large intestine. Peyer's Patches consist of a large number of lymph nodules grouped together, they are confined to the small intestine and are most numerous in the ileum. The chief bowel lesion in typhoid fever occurs in these aggregations. The large intestine extends from the ileo-caecal valve to the anus. When undistended it is considerably larger than the small intestine; it has thicker sacculated walls, appendices epiploica and longitudinal muscular bands. It is five to six feet long, its breadth is about three inches at the caecum and gradually tapers to



the anus with the exception of a dilation at the rectum.

The caecum measures two and a half inches in both vertical and transverse diameters, it is supported and held in position by the peritoneal folds covering its anterior and lateral walls; on the posterior part of its median wall is the ileo-caecal orifice guarded by the valve. There is also the small opening of the vermiform appendix. The ileo-caecal valve is an arrangement to prevent the faeces or other discharge from entering the small intestine.

The vermiform appendix is a blind tube three to five inches in length, leading off from the lower and inner surface of the caecum. It is of importance on account of the frequency of inflammatory changes in it often as the result of faecal delay. The ascending colon runs up to the under surface of the liver where it bends forwards and to the left and passes into the right flexure of the colon; its posterior surface is free from peritonium as a rule and is in direct contact with the posterior abdominal wall. The hepatic flexure is usually an acute bend leading to the transverse colon which is long and looped running across the abdomen to the splenic flexure. The first few inches of the transverse colon are comparatively fixed; immediately beyond this the colon has a long

mesentery which allows it to hang down in front of the small intestine. This portion is therefore very moveable and its position is influenced by posture and by the condition of other viscera. Towards the left extremity the mesentery shortens again bringing the gut as far as the inferior end of the spleen where it passes into the splenic flexure. Its average length is more than twice the distance in a direct line between the two extremities. From here the descending colon passes down the left side of the abdomen to the sigmoid colon.

The sigmoid colon commences in the left iliac fossa and passes down into the pelvis on the left side, leaves the pelvic cavity on the right side and then suddenly bends backwards and downwards to terminate in the rectum opposite the middle of the sacrum. This junction is marked by an increase in the circular muscular fibres producing a narrowing of the gut - this is the sphincter of O'Beirne. The sigmoid colon which is the narrowest portion of the large intestine varies greatly in length and position; its mesentery is very short at each end but is much longer between these points.

The rectum extends from the termination of the sigmoid to the anus. The ampulla of the rectum is divided into compartments of various sizes by Houston's valves.

The special organs of digestion



found in the alimentary canal are the gastric glands - pyloric and cardiac. The small intestine is lined with tubular glands giving rise to a secretion - the succus entericus.

The organs of digestion outside the canal are the salivary glands, the liver and pancreas. Other glands such as the thyroid, thymus, adrenals and spleen have certain connections with the process of digestion.

The stomach in man belongs to the simple type as distinguished from the compound type of other mammals. This simple stomach is divided into parts which have different properties and functions. The main interest lies in the separation of the pyloric part of the stomach from the main cavity. During the time food remains in the stomach the musculature contracts in such a way that there is a thorough mixing with gastric juices, and the more fluid portions are ejected from time to time through the pylorus. It has been shown that all movements of the stomach cease as soon as the animal experimented upon showed signs of anxiety, rage or distress.

Various forms of intestinal movements have been described. Peristaltic waves run along the gut in such a way that a marked contraction of the circular muscles continues towards the anus. At the same time the part of the gut below the

constriction becomes dilated. Other waves move the contents along at intervals. The purpose of these movements is to mix the chyme thoroughly with the digestive secretions, to facilitate absorption and to move the contents towards the colon.

The movements of the large intestine are slower and less frequent and can transport the contents of the caecum into the rectum in twenty to thirty hours. Besides the waves towards the anus there appear in the colon waves in the opposite direction, they move the contents back and forth and thus facilitate watery absorption. The ileo-caecal valve is important in connection with this anti-peristalsis. The mechanical change in the food is performed by mastication and the kneading movements of the stomach and intestines. At the same time a chemical action is going on and for this purpose the food does not pass through the canal at an even rate but is retained at different places to be subjected to the chemical action of the digestive secretions.

Our various foods are classified under proteids, fats, carbohydrates, water and inorganic substances. The chemical changes are effected through the agency of a group of bodies known as enzymes. The activity of the enzymes is specific, briefly those acting on carbohydrates are ptyalin of the salivary secretion, amylase of

pancreatic secretion and maltase from small intestine, salivary and pancreatic secretion. Steapsin a pancreatic enzyme splits fats into fatty acids and glycerine. Those acting on protein are pepsin (gastric), trypsin (pancreatic), eripsin (small intestine).

Very little absorption takes place in the stomach; in the small intestine the absorption of sugar, albumoses, peptones and fats take place on an extensive scale. The colon plays an important part in the process of digestion. Mammals are the only vertebrates in which the large intestine is much developed. Metchnikoff's theory is that the large intestine is increased in mammals to make it possible for these animals to run long distances without standing still for defecation - the organ therefore is a reservoir of waste matter. According to this theory the extreme development of the large intestine would supply a real want in the struggle for existence. The accumulation of waste matter may have its disadvantage, it becomes a nidus for microbes which produce putrefaction harmful to the organism.

The secretion of the large intestine contains much mucus, shows an alkaline reaction but has no distinctive enzymes.

The contents remain for a long time in the large intestine and since they contain the digestive enzymes received in the small intestine

the digestive and absorptive processes no doubt continue as in the small intestine. An interesting feature is the marked absorption of water in the large bowel, this is not compensated for by any secretion. The alkaline reaction in the large bowel makes a favourable environment for the growth of bacteria, particularly the putrefactive bacteria which attack protein material.

Putrefaction is a normal occurrence in the large bowel; furthermore the colon seems to be the place for the absorption of toxins developed in the course of abnormal decomposition of proteins, this seems to be due to the influence of prolonged/<sup>bacterial</sup> putrefaction or the presence of abnormal types of bacilli which produce in the body effects of toxic character. This so-called auto-intoxication is becoming recognised as a cause of certain obscure diseases.

Numerous bacteria which are able to hydrolize the foods, particularly carbohydrates and proteins, are found in the intestine. Fermentation of the carbohydrates gives rise to organic acids - such as lactic and acetic - but none of the products of fermentation can be looked upon as distinctly toxic; putrefaction of protein on the other hand gives rise to a number of nitrogenous products which are supposed to have a toxic action. Normally in the small intestine carbohydrate fermentation is the

characteristic action of bacteria, while in the large intestine protein putrefaction undoubtedly occurs. Bacteria do not cause protein putrefaction in the small intestine as long as there is carbohydrate material present, the organic acids of fermentation tend to neutralize the alkalinity of the intestinal secretion and an acid medium is unfavourable to the activity of the bacteria which attack proteins.

From this standpoint it will be seen that bacterial activity in the small intestine will vary according to the character of the diet.

The splitting up of the protein molecule, in the large intestine is very complete; the list of end products includes peptones, protioses, ammonia, and the various amino acids, also indol, skatol, phenol, etc., and such gases as carbon dioxide, hydrogen, marsh gas, hydrogen sulphide, etc. Many of these products are given off in the faeces mixed with undigested food material, dead bacteria, etc., while others are absorbed and subsequently excreted in the urine. Indol and skatol have long been known to occur in the urine and the amount to which they occur is taken to indicate the extent of putrefaction in the large intestine.

Recognising these bacterial changes as of normal occurrence we must ask is it necessary



to normal nutrition? According to the teachings of Metchnikoff bacterial putrefaction is the occasion for constant danger to the human organism. The constant absorption of bacterial toxins from the intestine is one of the important causes of loss of resistance on the part of the body to the changes which bring on senescence and death. We must recognise that even if the presence of bacterial putrefaction confers no positive benefit the organism has adapted itself to neutralize their injurious action.

The healthy individual should have at least one copious faecal evacuation in every twenty four hours - the average amount being four to six ounces in weight. The shape depending upon the amount of water present. When the amount of contained water drops below 50% - 25% the faeces become hard and scybalous which often results in faecal impaction. When a certain amount of waste product has collected in the sigmoid it starts up peristaltic action and faeces are forced through O'Beirne's sphincter into the rectum; then an imperative desire to empty the bowel is created. If this desire is constantly ignored the mucous membrane loses its sensitiveness, the muscular coat becomes weakened and as a result large quantities of faeces may accumulate without causing any desire to empty the bowel.



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In normal people the intestinal contents beyond the splenic flexure are evacuated at defaecation. We may have a condition analagous to urine retention with overflow - sometimes described as fragmentary constipation.

These two physiological factors to be considered are the passage of the residue of food from the stomach to the sigmoid colon and the complete evacuation of the sigmoid colon at regular intervals. Both these factors depend upon a proper supply of residue and there may be delay in either of these sites or perhaps in both. This delay may be due to deficient motor power in the muscular wall of the intestine, as occurs in senile stasis, in the anaemias and in certain cachectic conditions.

An increased resistance is offered as the contents move along the canal - firstly by the decrease in the lumen and secondly by the gradual absorption of water the faeces become more solid.

A proper supply of food is required in order that there should be enough waste product to stimulate peristalsis. When food enters the stomach a reflex peristalsis is set up in the lower end of the ileum causing chyme to be forced into the caecum; reflex peristalsis is also stimulated in the colon, a poor appetite causes a diminution of the reflexes. Insufficiency of food taken in the extremely poor and in cases of obstruction of the

oesophagus and stomach is an important factor.

As the result of modern methods of preparing foods many diets contain too little chemical or mechanical excitants of intestinal activity - only completely digestible starch is used for making bread and the greater part of the cellulose is removed from wheat. Vegetables and fruits are not eaten in sufficient quantities and potatoes and bananas which contain little cellulose are the commonest used by the poorer classes. It is mainly to the badly chosen diet of the poor and the over refinement in the cooking of the rich that civilized people owe much of their intestinal trouble.

A good general circulation favours peristalsis; we are familiar with the intestinal derangements occurring in cases of fracture and in people on long sea voyages. The excessive vomiting of sea sickness acts by removing fluid and depriving the canal of its supply of residue. Intestinal stasis is caused by the contents becoming dry and hard either as the result of an insufficient amount of fluid taken or excessive loss of water by other channels - this occurs in cases of diabetes and in prolonged lactation.

In hot weather and during prolonged muscular exercise much water is lost by the skin and lungs. During the writer's work in Queensland he often met this condition and was at first puzzled

to explain why stasis should occur in people who indulged in healthy outdoor games such as tennis and horse riding.

Narrowing of the intestinal lumen causing obstruction to the passage of contents may be due to:-

(1). Organic stricture.

(2). Kinking of the intestines is generally supposed to be the cause of delay which is so frequently associated with visceroptosis.

Glénard showed that many cases of visceroptosis presented abdominal symptoms. The three factors presented by these cases are general ptosis, the formations of membranes and bands and general skeletal and muscular changes. The ptosis has been regarded by many as the sole cause of these conditions, others consider that the conditions are only associated being produced by a common cause.

It has been shown that the stomach is prolapsed, becoming U shaped with a kink at its middle. The greater curvature may be in the pelvic cavity. The duodenum is mobile. The whole colon is lengthened and dilated, it is freely mobile and may pass into the pelvic cavity. The liver is prolapsed and rotated. Both kidneys are mobile and prolapsed especially that on the right side. The uterus is prolapsed and displaced.

Bands and membranes of a well defined nature have been demonstrated by Lane and others.

On the under surface of the mesentery of the small intestine within a few inches of the ileo caecal valve may be found Lane's ilial band. Spreading obliquely downwards and inwards from the parietal peritonium on the outer side of the colon over the caecum and ascending colon is a veil-like sheet of membrane - Jackson's Membrane. Other bands pass from the hepatic flexure, and on the outer aspect of the descending colon - becoming more marked at the splenic flexure. A band is found at the junction of the iliac with the pelvic colon - this is the site of "first and last kink of Lane". Contraction of these bands may lead to sacculations in the intestinal wall - diverticuli. Loops of dilated bowel may twist on their axis - volvulus. There are three theories as to the origin of these bands.

(1). The congenital theory - that the bands are a result of physiological evolution sometimes termed the process of peritoneal zygois. No doubt they are found at birth and in the foetus.

(2). The inflammatory theory ascribes the bands and membranes to adhesions resulting from such conditions as appendicitis and colitis. Against this theory (a) is the fact that the appendix may be absolutely normal and yet there may be extensive membranes reaching over the ascending colon and caecum. (b). The vessels in the membranes run parallel contrary to what is found in inflammatory tissues.

(3). Lane's theory - that they are general evolutionary structures produced on a mechanical basis - the fault lies in prolonged standing or sitting in the erect posture. The contents of the ascending colon fall into the caecum which becomes distended and sags into the pelvis downwards and inwards. Certain lines of strain or resistance become marked first as thickenings of the peritonium supporting the bowel and later as definite bands and membranes. Jackson's Membrane and Lane's ilial band hold up the caecum and so counteract the downward drop. The next stage in the process of evolution is that the bands contract and though they thus give better support to the caecum, yet they cause kinking and angulation of the bowel, especially in the lower part of the ilium. The ilium proximal to the kink becomes distended and the loaded coils fall into the pelvis thus increasing the kink and still more obstructing the ilial contents leading to ilial stasis. Lane holds that this distention passes upwards and that bands are formed at higher and higher levels, giving rise to local lesions such as duodenal and gastric ulcers. Against this theory is the important anatomical fact of their presence in the foetus.

The skeletal and muscular changes occur in two types:-

(1). The virginal - the patient is thin and poorly



developed, and in childhood is often taller than normal. The thorax is shallow and shows a narrow epigastric angle. The upper abdomen is narrow and the waist is long, the shoulders rounded and the lumbar curve is diminished. There are signs of general muscular weakness. This type may be hereditary or acquired. When this type shows abdominal symptoms it is spoken of as "ptosis habitus".

(2). The maternal - there is no skeletal change, the abdominal muscles are atrophied, so that the lower abdomen becomes distended and there is often marked loss of weight, not all of these cases develop abdominal symptoms.

A slight positive pressure is maintained by the tonic contractions of the abdominal muscles and pelvic floor, the viscera being supported in position and their peritoneal attachments remaining slack. If the positive pressure is reduced, the diaphragm descends with the organs which are in contact with it when the erect attitude is assumed.

The loss of tone in the abdominal muscles may be due to deficient exercise or wasting diseases but most frequently it results from frequent parturition. Any disease causing excessive removal of intra peritoneal fat reduces the intra abdominal pressure.

The degree of ptosis depends upon the



weight of the organ and its contents and the length and elasticity of its attachments.

If visceroptosis caused obstruction at the flexures it would be associated with colic and hypertrophy of the musculature above the obstruction - both these conditions are rare in visceroptosis.

The constipation so often associated with visceroptosis is due to weakness of the abdominal muscles and pelvic floor leading to inefficient emptying of the pelvic colon and rectum - Dyschezia.

The viscera drop when the patient is erect and exerts a pull on the peritoneal attachments causing vague abdominal discomfort which is relieved by lying down. The centre of gravity is altered and to maintain the upright position certain muscles are given more work causing backache. Giddyness and syncope may occur as the result of engorgement of the visceral veins

Many conditions of a pathological nature occurring in the various organs and tissues of the body are considered to be due to this condition of stasis. How are the changes brought about and what are the further changes which take place in this drainage system which is completely at fault? We have seen that there is a delay in the passage of the contents at one or more points - this delay leads to bacterial infection of the contents with

increased decomposition and putrefaction - the resulting toxins being absorbed into the circulation in quantities too great to be neutralized by the ordinary agencies e.g. the liver, thus causing a poisoning of the body - intestinal intoxication. This intoxication is manifested by a degeneration of every tissue in the body and by certain definite clinical characters. There is no doubt that some symptoms are purely reflex in character and are due to mechanical pressure by faecal accumulations.

The theory of intestinal intoxication is based on clinical rather than scientific evidence. Some persons have insomnia, headache, vertigo, general malaise and inability to concentrate on work if they fail to have their usual daily evacuation. Many remain well with an evacuation once a week or perhaps at longer intervals. Still there is a definite clinical type of case as described by Lane in which obstinate constipation is one of the most constant symptoms - the toxic type.

The first evidence is a removal of fat causing an appearance of premature senility. Certain organs are retained in position by virtue of surrounding fat and these organs become displaced notably the kidneys, uterus, and mammary glands. The skin becomes wrinkled and pigmented, bony points become more prominent and the buttocks are flattened. The secretions from the flexures become more

abundant and offensive. The hair falls out and there is abundant growth of fine hair on the face and forearms. The limbs become cold and blue, a papular eruption often develops and is frequently found in girls. The muscles waste and become relaxed producing various deformities such as lateral spinal curvature. This condition in the abdominal muscles is a further cause of visceroptosis.

The muscular wall of the intestine wastes, it loses its rounded form and becomes inelastic and very thin. The heart muscle becomes soft with low blood pressure usually in the female. In man, especially where the kidney has been infected, we find the left heart enlarged, an atheromatous aorta and high blood pressure. Symptoms of an asthmatic character may occur. Perhaps the worst feature of these cases is the depressed condition of the nervous system - they are usually diagnosed neurasthenia. The breasts become hard and cystic. The thyroid gland is diminished in size but whether this is a result or cause of stasis is a disputed point.

The individual because of his lowered vitality becomes more susceptible to diseases and infections by micro-organisms. Direct infection from the stagnating contents leads to catarrh of the intestinal mucous membrane, the bile and pancreatic ducts with the formation of

calculi and inflammatory changes in the organs. Infection of the urinary tracts with extension to the kidneys sets up the condition of bacilluria.

The organisms of the intestinal tracts vary in type and numbers in the different parts of the tract. In the mouth streptococci predominate largely. The contents of the stomach and duodenum are practically sterile due to the presence of Hcl. The contents of the lower end of the small gut and the large intestine are alkaline and so form a good medium for the growth of bacteria. It is in the caecum and colon that the growth of bacteria is most prolific. The coli group of organisms largely predominate here. In the lower part of the colon we find members of the anaerobic group e.g. B. Aerogenes Capsulatus, etc.

The toxins may be (1) ingested in the food.

(2). Bacterial toxins - none of the organisms commonly found in the alimentary canal form any soluble toxins such as those formed by the bacillus of diphtheria or tetanus.

(3). Toxins produced as the result of decomposition fermentation and putrefaction of food. We have seen earlier in this paper that the alkaline contents of the large intestine make a favourable environment for the growth of putrefactive bacteria which attack protein material. It is the nitrogenous product of this putrefaction in a stagnant colon which is regarded by many as the

chief agent in the process of intestinal intoxication. It has not been shown experimentally that these end products are markedly toxic - the greatest obstacle has been the difficulty of isolating the toxins and accounting for the manner in which they produce their pernicious results.

When such bodies are absorbed from the canal they are rapidly taken to the liver and rendered harmless; moreover the gastric juice, pancreatic secretion, bile and succus entericus all have a protective action by destroying bacteria and neutralizing their toxins to different degrees.

These bacteria flourish more readily in the liquid contents than in the solid or semi-solid contents of constipation and one would be inclined to argue that constipation should tend to prevent intestinal intoxication. The position is that although there is an accumulation of hard and dry faeces there is always a constant supply of liquid contents from above which gives the bacteria their required nidus. The accumulation of hard faeces and gases of decomposition leads to dilatation of the canal and an inflammatory condition of its mucous membrane. This devitalized mucous membrane does not form an efficient barrier to the entry of toxic products and allows them to pass through in excessive quantities.

We know clinically that the mere



emptying of a chronically overloaded tract does not remove the symptoms at once - time must elapse before the damaged mucous membrane has recovered its equilibrium.

We see then that more toxins may enter the portal system than can be effectually dealt with - the excess finding its way into the general circulation to be excreted by the kidneys and skin. Several of the ductless glands (thyroid etc.) have a certain anti-toxic action.

The toxins attack the organs and tissues and the effects will depend on the resisting power of the individual. Lane states that there is extraordinary variation in the resisting power of the individual as manifested by the colour of the hair - the darker the hair the lower is the resisting power, on the other hand if the hair is red the individual has a maximum of resisting power. This is shown very conspicuously by the action of the poisons on the appetite of the individual.

It has been shown that the lymph nodes of the alimentary tract in healthy animals yield cultures of bacteria, which also may be found in the liver and kidneys - they never accumulate but are rapidly destroyed in these organs. When stasis occurs, especially in the caecum and ascending colon where the contents are fluid and bacteria abundant, an excessive number may reach the



blood and those not destroyed by the liver and spleen are excreted by the kidneys. Normally the urine contains no bacteria, but *Bacillus Coli Communis* has been found in the urine in cases of stasis. This may lead to pyelitis and pyelonephritis. The infection may spread direct especially on the right side where bacteria are more numerous and there is a close lymphatic connection between kidney and colon.

These bacteria free in the blood stream may collect at various situations setting up subinfection which will account for rheumatism and arthritis, etc., which are sometimes associated with stasis.

The use of Xray in diagnosing these conditions should be taken advantage of on every occasion. From the practical side the differential diagnosis consists in distinguishing between obstructive and non-obstructive stasis. Non-obstructive stasis is frequently found in early life and can be traced to irregular habits, sedentary occupations or errors in diet. There is rarely much abdominal pain and when present it is of an indefinite nature and not localized. There is generally a sallow complexion and a little emaciation. The condition goes on for years and an evacuation can be secured by artificial means which usually gives relief. Many of these cases become

complicated by faecal impactions, angulations or twistings when obstruction is superadded.

The obstructive cases are usually found in middle or later life and frequently the onset of symptoms is sudden or may follow some inflammatory condition such as appendicitis, peritonitis, adhesions or tumours. There is often distension and colicky pains, the distension is confined to the part above the obstruction; there is diarrhoea alternating with constipation and a sense of weight or fullness in the abdomen. The passage of contents through the obstructed point causes a sensation of pain which is usually definite and localized. Indican-uria is more marked in the obstructive type of stasis.

The first object in the treatment of this condition must be the removal of the cause. We must investigate the initial cause and the consequences or end results. All treatment will be unsatisfactory which is aimed at the removal of the consequences without removing the primary cause; on the other hand where such conditions as angulations, faecal tumours, etc., have developed, treatment of the stasis alone will be unsatisfactory without treatment of the consequences.

All our efforts are directed towards facilitating the passage of the contents through the intestinal tract and obviating the mechanical

and chemical results of any fault which may develop.

The subject of treatment may be dealt with under two headings:-

- (1). Non-operative treatment.
- (2). Operative treatment.

Where there is no definite organic obstruction of the intestine non-operative measures should be used, and this ~~case~~ be determined with fair accuracy by the modern use of Xray.

A systematic course of treatment should be mapped out for each case.

Many cases commence in childhood as the result of ignorance or neglect on the mother's part. The child should be taught regularity in the times of eating, sleeping and moving the bowels. A diet which favours regular evacuation should be given. An attempt should be made every day at the same hour to empty the bowels, but the desire to defecate at any time should have prompt attention. The closet should be clean and comfortable and properly constructed. Schools and other public institutions should have a good supply of water-closets. Australian bushmen when they come to town have often complained to me that they could not defecate satisfactorily, having been accustomed to the squatting position. Many cases with weak abdominal muscles are greatly assisted in assuming

the squatting position. Great benefit is derived from dietetic treatment, as indeed many cases are due to dietetic errors.

We have seen that taking foods into the stomach stimulates peristalsis. A proper quantity of food should be taken at regular hours, it should be well masticated. The teeth should be clean and those carious should be removed or stopped. Pyorrhoea should be attended to - the ill effects of oral sepsis are increased by stasis.

Most cases will be improved by an increase in the quantity of vegetable foods, especially those which contain much cellulose and organic acids, whole meal bread, oatmeal in the form of porridge, biscuits or oat cake are excellent sources of cellulose. All green vegetables and such fruits as oranges, melons, figs, raisins, prunes, dates, plums, cherries, peaches, etc., are recommended. Nuts, potatoes and bananas are not of much value. Jams and marmalade are useful.

Fats should be increased in the form of butter, cream, fat, bacon, or cod liver oil, their products stimulate peristalsis and act as lubricants.

Fish, poultry, meat, and eggs supply the necessary protein in the diet and are advisable in moderation. They should be gradually reduced in cases showing symptoms of intestinal intoxication,

in this way putrefaction and the production of toxins are much reduced.

The population of Queensland is the victim of three great dietetic errors:-

(1). Deficient water drinking - in this hot climate there is constant excessive loss of water through the skin and lungs and it is necessary to compensate for this by drinking a sufficiency of water. This water should not be taken with meals because the amount required would act as a diluent to the gastric juices. It should be taken in the morning before breakfast and half an hour before other meals and again at bed time.

From one to two tumblersful may be sipped at a time and it should be taken cold except in those cases where it sets up spasm and colic.

This routine water drinking is an essential part of life in this climate. It prevents hard dry faeces with consequent stasis, it also flushes the secretory apparatus and makes the urine less concentrated. A concentrated urine ~~irritates~~ irritates the kidney mucous membrane and is a factor in the production of renal calculi.

(2). Excessive drinking of long infused tea - tannin tends to produce constipation. Indian and Ceylon teas contain more tannin than the China variety. The longer tea is infused the greater proportion of tannin it contains. It should be



always freshly infused and the water should not be left in contact with leaves for more than a few minutes. The addition of milk or cream renders some of the tannin inert.

(3). Excessive meat eating. In Queensland where meat is plentiful and cheap protein putrefaction is a common complication of stasis. It is a common practice for the inhabitants to eat meat at least three times daily and in excessive quantities. Reduction of the meat diet in many of the early toxic cases leads to a rapid improvement. The constipating effect of an exclusive milk diet is due to the deficient residue and can be rectified by the addition of a sufficient quantity of vegetable foods.

Sour milk owing to the lactic acid it contains is recommended in cases of intestinal putrefaction, the lactic acid has an inhibitory action on the putrefactive bacteria in the alkaline colon, lactic acid is also an intestinal stimulant. Many cases of stasis resulting from inefficient daefication are satisfactorily treated by enemata, indeed treatment of all cases of much duration with accumulations in the colon and rectum should be begun with enemata.

High enemata are given under low pressure with the patient on his back, sometimes lying on the right side facilitates the passage of



fluid at the splenic flexure. The tube is inserted just inside the rectum and one to two pints of fluid are introduced, this is retained for about a quarter of an hour when an effort should be made to defecate. There is no danger of over distension of the bowel so long as it is done under low pressure. If the fluid is retained a further low enema of about one pint will stimulate peristalsis with the desired result.

Turpentine added to an enema stimulates peristalsis and the expulsion of flatus, it is very valuable in post-operative flatulent distention.

The majority of these cases can be cured without the aid of drugs especially in the early stages.

The constant indiscriminate use of purgatives is to be stopped as the constant irritation of the mucous membrane decreases its excitability.

It is only when ordinary hygienic and dietetic methods have failed that properly regulated doses of aperients may be recommended.

Vegetable aperients irritate the mucous membrane and reflexly lead to increased peristalsis. Cascara and castor oil act on both the small and large intestine. Aloes and senna act on the large intestine only. In cases with depressed

nervous system nux vomica may be given with a vegetable aperient.

The griping effect of vegetable purgatives can be overcome by combining them with small doses of belladonna. Phenolphthalin stimulates both secretion and peristalsis without colic; it has no action on any other organ; it is often combined with agar agar to advantage. Castor oil is valuable for occasional use, its action is certain and it does not cause colic.

Saline purgatives are absorbed from the small intestine and act from the blood on the nerve supply of the colon producing increased motor and secretory activity, they are best given dissolved in a considerable volume of water as they are most rapidly absorbed when isotonic with blood plasma. They should be given on an empty stomach preferably before breakfast. They do not accelerate the passage of chyme in the small intestine and therefore interfere little with the ordinary digestive processes. Most of the natural aperient waters depend for their action on the presence of magnesium or sodium sulphates.

Mercurial purgatives produce irritation of the mucous membrane and should not be used in chronic stasis. From one drachm to half an ounce of liquid paraffin taken two or three times a day becomes mixed with the faeces rendering

them soft and easy to carry along the colon.

Regular exercise in the open air increases the appetite, strengthens the voluntary muscles of defecation and by producing rapid changes in the intra abdominal pressure stimulates peristalsis - horse back riding, swimming and climbing are advised. Surf bathing combines exercise with external hydrotherapeutics and is very valuable. Relaxed abdominal muscles and visceroptosis are best prevented by care during the puerperium, when they are present courses of treatment may be mapped out chiefly with the object of improving the tone of the muscles. In severe cases a period of adequate rest may be necessary to allow recovery of the overworked muscles. Many exercises are performed in the prone position to allow the viscera to assume their normal position by the aid of gravity. Exercises are devised to improve the lumbar curve and widen the lower thorax.

Relief from mental worry and judicious rest will tend to increase the amount of body fat. Frequently these remedies fail because the patients are generally of the poorer class and have not the time or opportunity for the necessary rest and exercises. This class of patient also often suffers from underfeeding and errors in diet. The time required for rest can be reduced by supplying an abdominal belt, this belt should be carefully fitted

and should contain no pads which exert injurious pressure. The belt should be applied whilst the patient is lying down. Massage is beneficial in numerous cases where the abdominal muscle tone is deficient; it is also valuable where delay is due to want of activity of the intestinal musculature. The patient may in this case massage his own abdomen by rolling a cannon ball of about seven pounds weight, over the abdomen along the course of the colon.

In conjunction with these methods it is advisable to give a course of electrical treatment - it has a valuable suggestive influence - it may not increase the activity of the colon but the weak abdominal muscles derive benefit.

(2). Operative treatment.

This is indicated when there is definite obstruction. In the absence of this clear indication operative measures should only be resorted to when prolonged non-operative measures have failed.

Every effort should be made to locate the site of the obstruction and an Xray report should be obtained. The dangers and possible unpleasant results should always be weighed against the severity of the symptoms.

Many different forms of surgical treatment have been advocated, each to overcome

what is regarded as the primary factor.

(1). Division of bands and membranes to overcome kinking is indicated:-

- (a) where non-operative measures have failed.
- (b) to aid orthopoeedic measures.
- (c) where the stasis is not long-standing.
- (d) when it is impossible to distinguish the condition from organic lesions.

The appendix may be caught in a band with inflammation and adhesions, this may cause enterospasm. Appendicectomy giving great relief.

(2). Fixation of viscera.

(3). Attempts to refashion the abdominal wall.

(4). Attempts to overcome stasis by such operations as ileocolostomy and colectomy. These operations have largely been recommended by Lane for the relief of those conditions which he regards as dependent upon intestinal intoxication. They should only be advocated in cases where all other methods have failed.



Case 1.

Miss S. age 39 years, Brisbane. She complained of pains in the joints of the hands and ankles with swelling about the affected joints.

She was born in England and trained as a general and maternity nurse. In her girlhood she suffered from constipation and frequent headaches. She had been some years in Queensland and thought that for a time the climate improved her health. The constipation then became more marked and she noticed that her skin was becoming sallow. She perspired freely and complained that it had a heavy odour. Headache was becoming more frequent with a feeling of general depression. The tongue was furred and the hands and feet were cold and moist. The general condition improved with the taking of purgatives and the tongue cleared. She stated that she had lost weight. On examination she seemed depressed and anxious about her career as a nurse. Several joints of the hands and both ankles were swollen and painful. The appetite was good although she never took her food with relish. There was no tenderness of the abdomen. The lower border of the stomach was two inches below the umbilicus. The rectum was distended and contained a few scybalous masses. The uterus was in the normal position. The other organs seemed healthy. There were no signs of organic obstruction. The urine was normal. The rectum and

colon were emptied by lavage and she was given a diet rich in cellulose, the proteid in her diet was rapidly reduced. The medicinal treatment consisted in a prescription of magnesium sulphate and aloes to be taken in the morning on an empty stomach and followed by a glass of water.

She improved greatly under treatment but the joint condition remained.

Twelve months later she was seen again. She was almost melancholic, complaining of headache and depression. The joints were still swollen and painful. Mr Brooke-Kelly who had seen her before decided to perform a partial colectomy. He found a well marked band at the lower end of the ileum with kinking. The lower nine inches of ileum were also removed.

She made a good recovery after the operation. Seen some months later she was much improved mentally and had put on weight. The thickening around the joints still remained.

She is now matron in a small country hospital and is able to get about her work reasonably well.

#### Case 11.

Mrs K. age 48, Townsville, complained of general feeling of depression, pains in both knee joints and loss of appetite. She was past the menopause

and had no children. She had always suffered from constipation - the bowels often acting at intervals of seven days. The taking of aperients caused abdominal pains associated with headache. Her diet was made up largely of proteid - meat being taken on an average three times a day. On examination she was poorly nourished having little subcutaneous fat. The teeth were very decayed with pyrrhoea. The tongue was thickly coated on its posterior two thirds. The abdomen was concave - the lower limit of the stomach was well below the umbilicus. There was tenderness in the left iliac region and the thickened colon could be palpated. The rectum was distended and contained some small hard masses.

There was nothing to report in the other organs. The treatment was at first directed to the teeth and gums. She was given several ordinary enemata and then had colon lavage, this was associated with marked headache and malaise which I think was due to liberation of toxins in the colon and their absorption into the general system.

She was given a diet consisting of whole meal bread, oat biscuits, porridge, green vegetables, fruit, specially oranges and melons, cream and fat in various forms. She was ordered to drink a glass of cold water three times a day half an hour before meals.

The following prescription was ordered:-

Paraffin Molle alb.	ozs.	4
Ext. Bynal.	"	3
Mel purata.	"	2
Cascara Evac.	drams	6
Misce		

Sig.- 2 drams thrice daily.

The above with the occasional use of a vegetable aperient and nux vomica kept the bowels regular. Her general condition gradually improved and she put on weight. The headaches persisted for some time but were less severe. The joint condition remained unaltered.

The Governments of the Australian States are at the present time laying plans for extensive immigration to their country. Ship surgeons should be asked to give small courses of lectures during the voyage instructing the new settlers in the broad principles of health in these warmer climates.

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